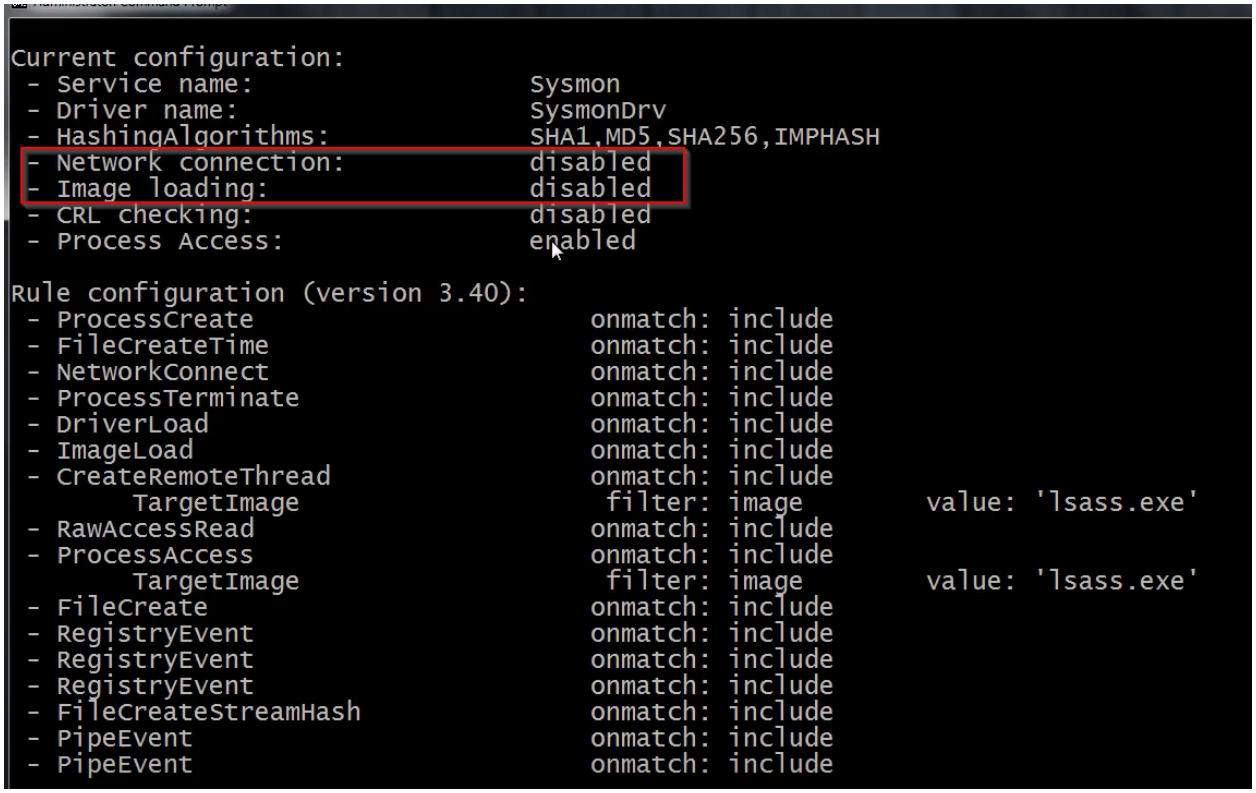
another variant of memikatz.exe called netkatz.exe.

This tool will go online and fetch memikatz.exe and then run it in memory:

Since it goes to the internet, lets check our configuration if its logging any network connection:



Here we see the Network connection and Image loading is disabled, Image loading is when a file is loaded into the memory.

Lets edit our configuration file to log Network connection and image loading:

In the network connection we change the onmatch=”include” to onmatch=”exclude” which we tell the Sysmon to exclude nothing and log everything as we want to log all the network connection, and we do the same for ImageLoad events too so any file that is loaded into the memory is logged:

```
File  Edit  Format  View  Help
<Sysmon schemaversion="3.40">
   <!-- Capture all hashes -->
   <HashAlgorithms>*</HashAlgorithms>

   <EventFiltering>
      <!-- Event ID 1 == Process Creation. -->
      <ProcessCreate onmatch="include"/>

      <!-- Event ID 2 == File Creation Time. -->
      <FileCreateTime onmatch="include"/>

      <!-- Event ID 3 == Network Connection. -->
      <NetworkConnect onmatch="exclude"/>

      <!-- Event ID 5 == Process Terminated. -->
      <ProcessTerminate onmatch="include"/>

      <!-- Event ID 6 == Driver Loaded.-->
      <DriverLoad onmatch="include"/>

      <!-- Event ID 7 == Image Loaded. -->
      <ImageLoad onmatch="exclude"/>

      <!-- Event ID 8 == CreateRemoteThread. -->
      <CreateRemoteThread onmatch="include">
        <TargetImage condition="image">lsass.exe</TargetImage>
      </CreateRemoteThread>

      <!-- Event ID 9 == RawAccessRead. -->
      <RawAccessRead onmatch="include"/>

      <!-- Event ID 10 == ProcessAccess. -->
      <ProcessAccess onmatch="include">
        <TargetImage condition="image">lsass.exe</TargetImage>
      </ProcessAccess>

      <!-- Event ID 11 == FileCreate. -->
      <FileCreate onmatch="include"/>

      <!-- Event ID 12,13,14 == RegObject added/deleted, RegValue Set, RegObject Renamed. -->
      <RegistryEvent onmatch="include"/>

      <!-- Event ID 15 == FileStream Created. -->
      <FileCreateStreamHash onmatch="include"/>

      <!-- Event ID 17 == PipeEvent. -->
      <PipeEvent onmatch="include"/>
   </EventFiltering>
</Sysmon>
```

Here we added the onmathc=”exclude” for the NetworkConnection and the ImageLoad events so all of events are logged that has Network connection and loading images into memory.

Save it and lets load it

```
c:\Tools\Sysmon>Sysmon.exe -c mimi.xml


System Monitor v6.10 - System activity monitor
Copyright (C) 2014-2017 Mark Russinovich and Thomas Garnier
Sysinternals - www.sysinternals.com

Loading configuration file with schema version 3.40
Configuration file validated.
Configuration updated.
```

Its loaded, now lets check it to make sure it’s the way we want it:

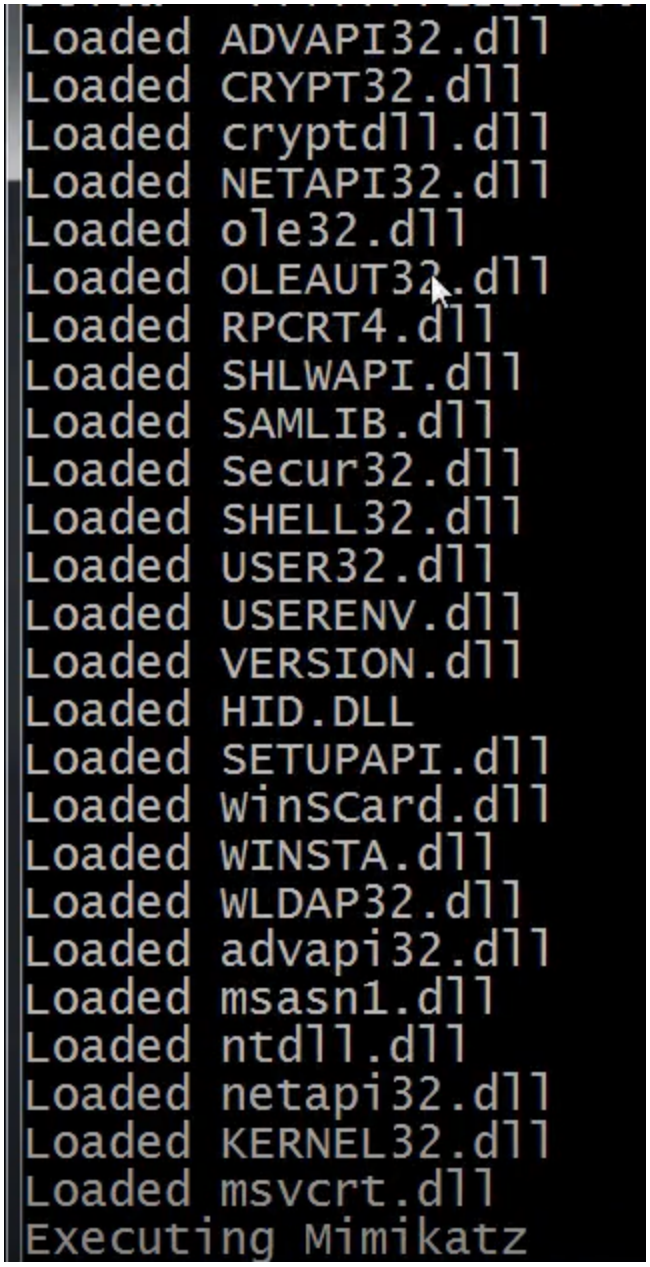
```
Current configuration:
 - Service name:                  Sysmon
 - Driver name:                   SysmonDrv
 - HashingAlgorithms:             SHA1,MD5,SHA256,IMPHASH
 - Network connection:            enabled
 - Image loading:                 enabled
 - CRL checking:                  disabled
 - Process Access:                enabled

Rule configuration (version 3.40):
 - ProcessCreate                      onmatch: include
 - FileCreateTime                     onmatch: include
 - NetworkConnect                     onmatch: exclude
 - ProcessTerminate                   onmatch: include
 - DriverLoad                         onmatch: include
 - ImageLoad                          onmatch: exclude
 - CreateRemoteThread                 onmatch: include
       TargetImage                     filter: image        value: 'lsass.exe'
 - RawAccessRead                      onmatch: include
 - ProcessAccess                      onmatch: include
       TargetImage                     filter: image        value: 'lsass.exe'
 - FileCreate                         onmatch: include
 - RegistryEvent                      onmatch: include
 - RegistryEvent                      onmatch: include
 - RegistryEvent                      onmatch: include
 - FileCreateStreamHash               onmatch: include
 - PipeEvent                          onmatch: include
 - PipeEvent                          onmatch: include
```

It looks the way we want it, but we also see the “CreateRemoteTHread” which will not help us at all in detecting mimkatz.exe as its not injecting it self to the lsass.exe, its accessing it.

Lets run the netkatz.exe:

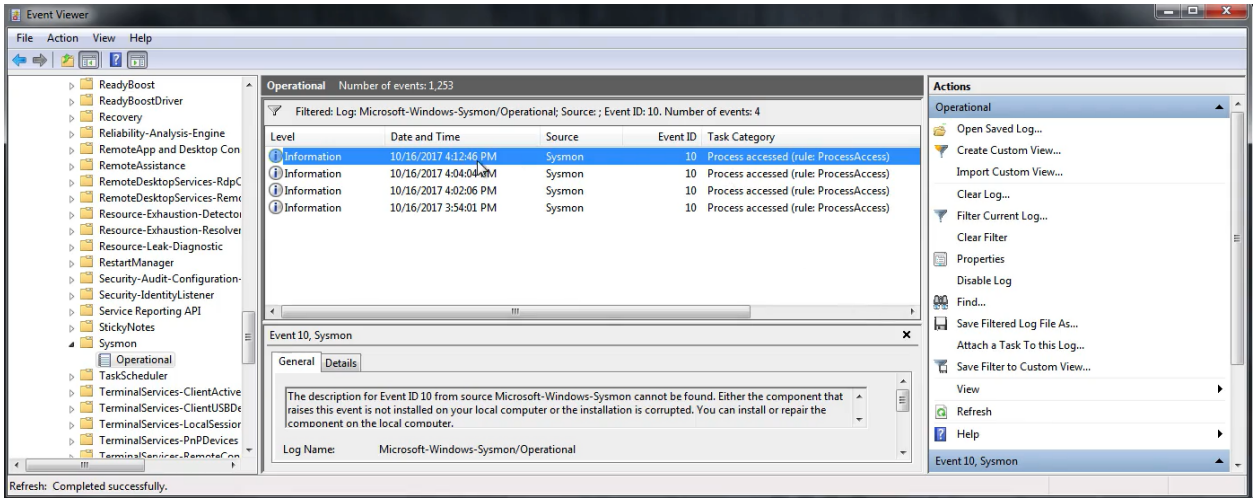
```
c:\Tools\Mimikatz\Netkatz>netkatz.exe privilege::debug sekurlsa::logonpasswords
```



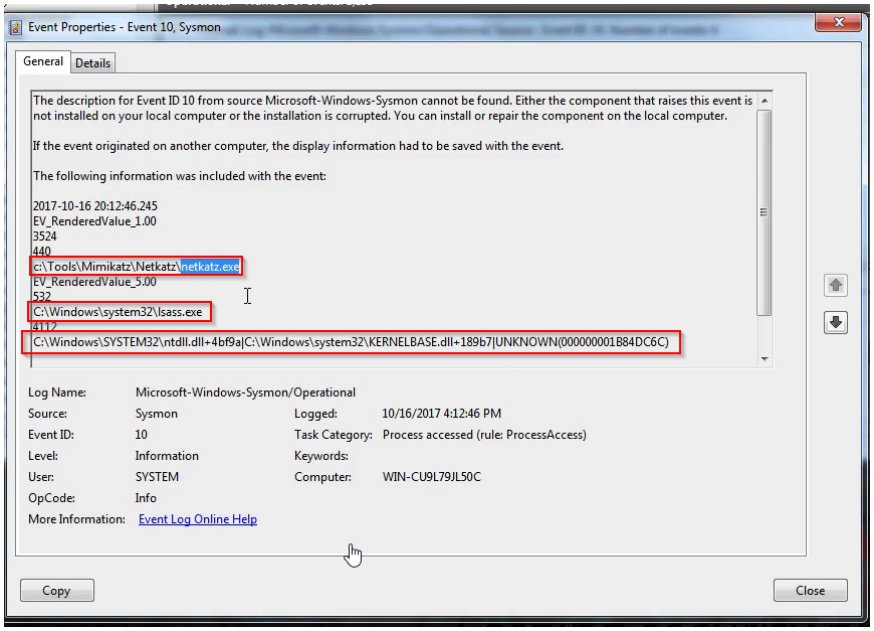
In the output of the netkatz.exe tool we here we see all the loaded DLLs by the Netkatz.exe into the memory:

Now lets check the Event Viewer for the logs:

Here we will filter for Event ID 10 to see the events related to a process access another process:

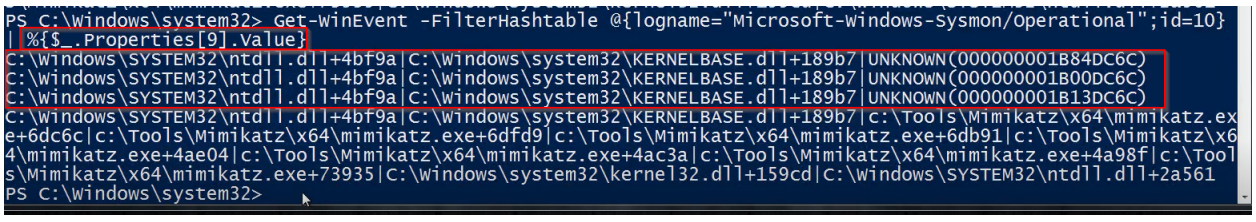


We see 4 events (idk why, maybe error in the demo), lets double click the first one and see its details:



Here we see the netkatz.exe accessed the lsass.exe process, but the dll part is deferent.

We can look at this dll part in the powershell.exe

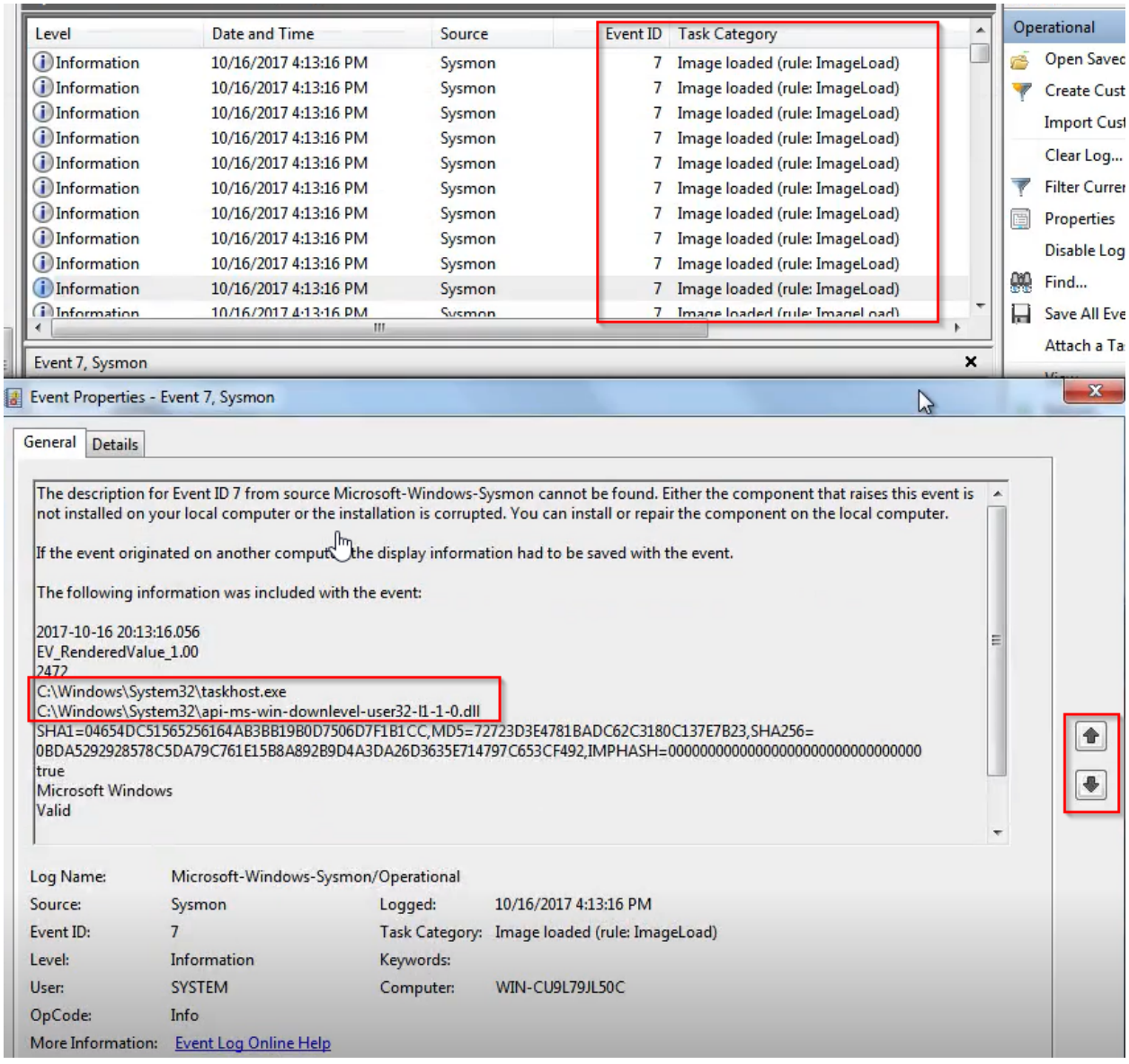


The first 3 parts looks like belong to 3 events of Netkatz.exe, but lets confirm this with getting the index 4 which is shows the process that did the accessing:

```
PS C:\Windows\system32> Get-WinEvent -FilterHashtable @{logname="Microsoft-Windows-Sysmon/Operational";id=10}
| %{$_.Properties[4].Value}
c:\Tools\Mimikatz\Netkatz\netkatz.exe
c:\Tools\Mimikatz\Netkatz\netkatz.exe
c:\Tools\Mimikatz\Netkatz\netkatz.exe
c:\Tools\Mimikatz\x64\mimikatz.exe
PS C:\Windows\system32>
```

And we are right, from that 4 events, 3 of them are netkatz.exe (maybe the demo had problems so the netkatz.exe was tried 2 times and then it was recorded on the 3rd time.)

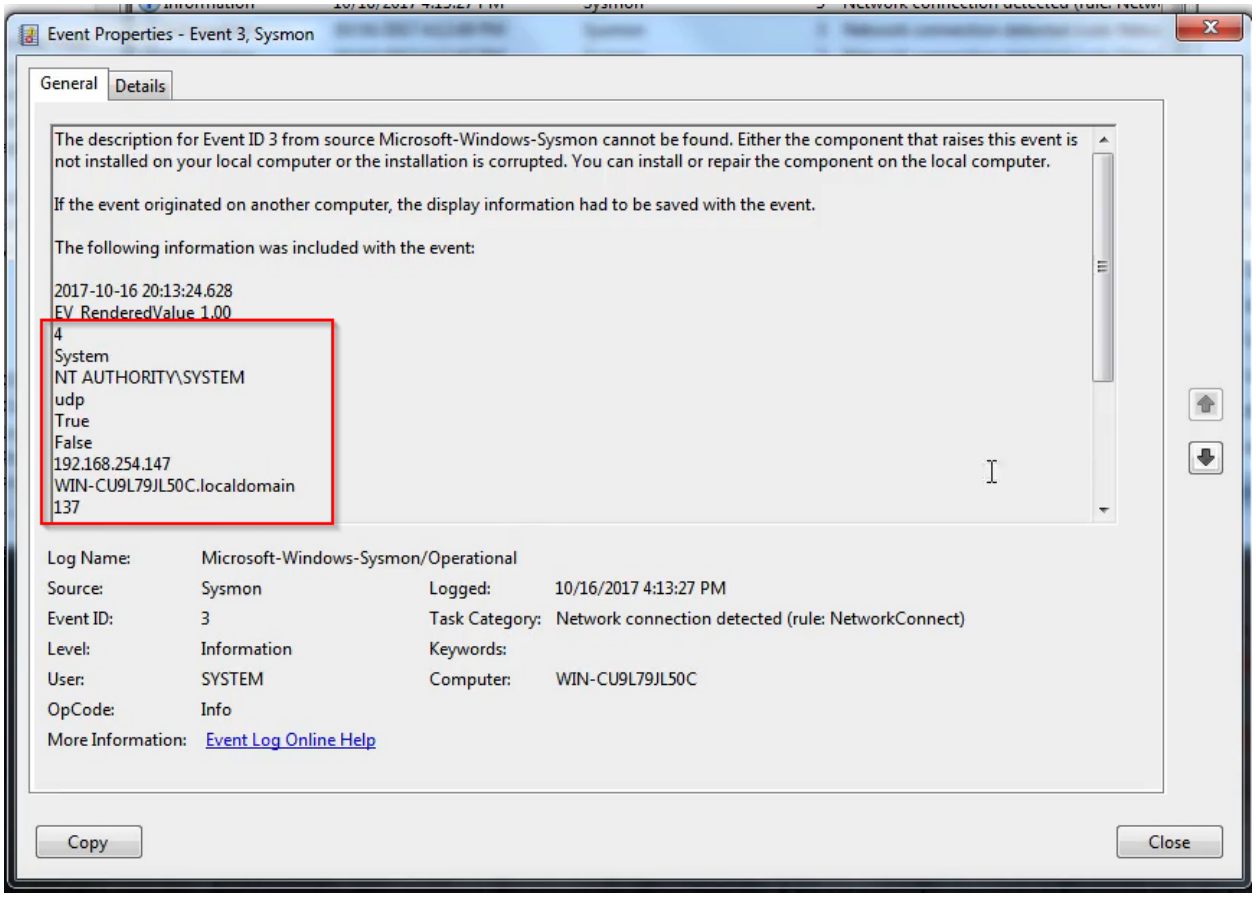
And we saw that netkatz.exe loaded images(files) into memory, and its event ID is 7:



Here we see the Event ID 7 events and to go through the events UP and Down we can click those 2 buttons. And here we see that that the process(taskhost.exe) that loaded this image “api-ms-win-downl-level-user32-l1-1-0.dll”

Now lets filter for event ID 3 to see the network connections IDs which we know the Netkatz.exe will go the internet and grab the mimkatz and run it in memory.

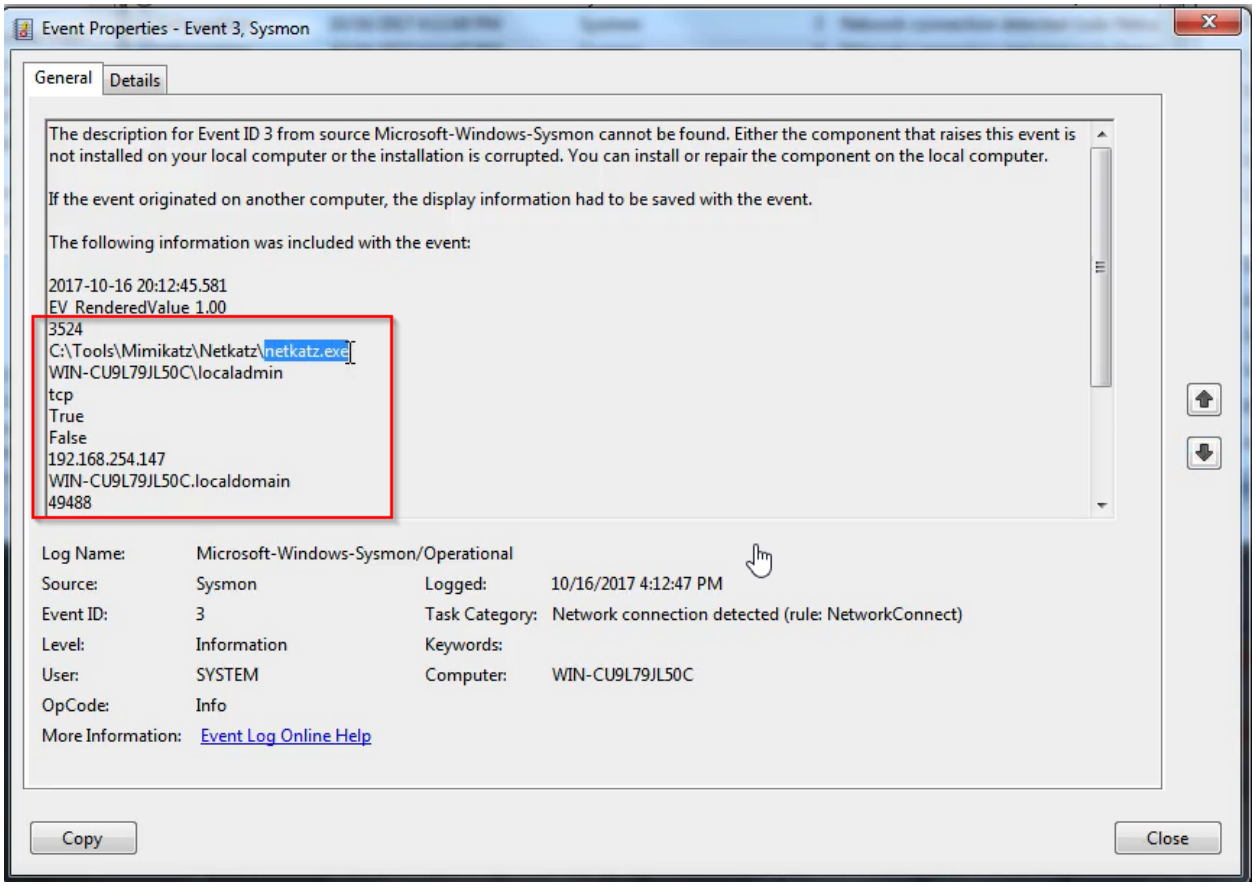
Here we will look at an event just to get an idea of how the logs of Network connection are in the sysmon:



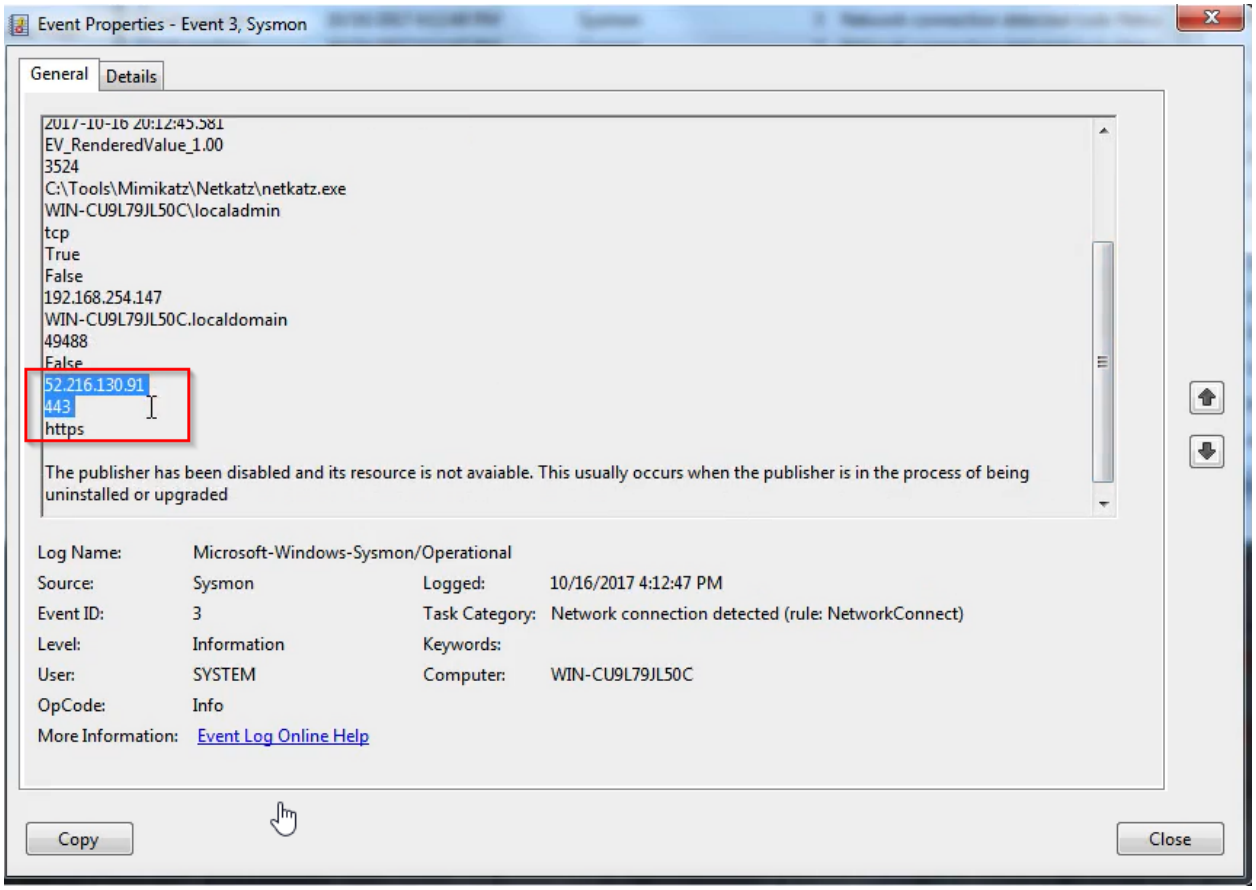
Here first we see the PID of the process that made the connection, then the process name, and then the User, and then the Protocol, and then we see the Host IP (this computer IP mean the IP of the host that made the connection), and at the bottom we see the port used to make this connection which is 137.

If scroll down we will see the details of the host IP that is receiving the connection and the port and protocol like HTTPS, FTP.

Now lets look at the log where the connection is made by netkatz.exe:



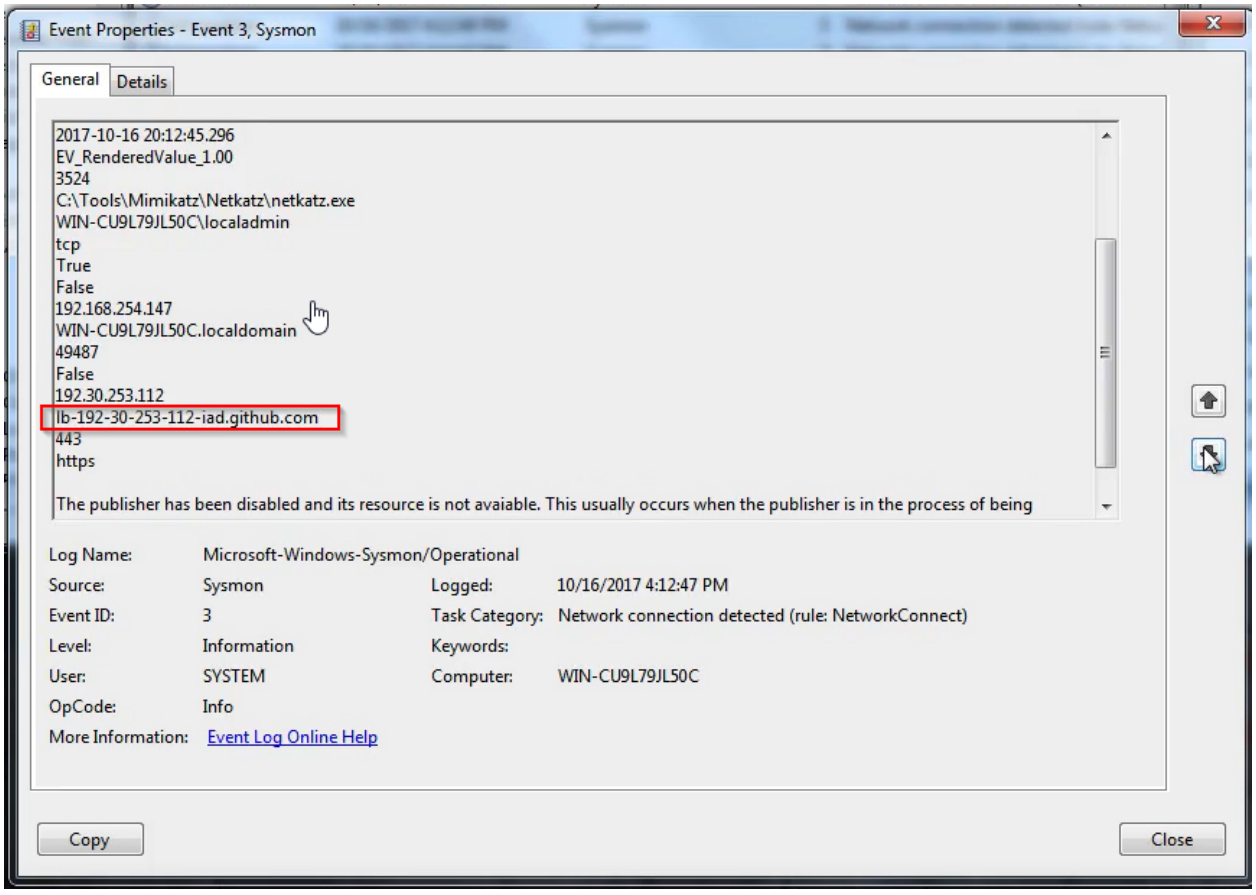
Here we see the process that made this connection has PID 3524 and its name is netkatz.exe, we see it used protocol TCP and the then we see the IP of the host that run the netkatz.exe, and it started the connection on port 49488 and lets scroll down this window to see more details:



Here we see the remote host, or the server that netkaze.exe made the request to, and it used to p n ,m ort 443 and its HTTPS protocol.

So the port 49488 was open by client to communicate , mean the computer that run the netkaze.exe and to the address it communicated to had port 443 open over HTTPS.

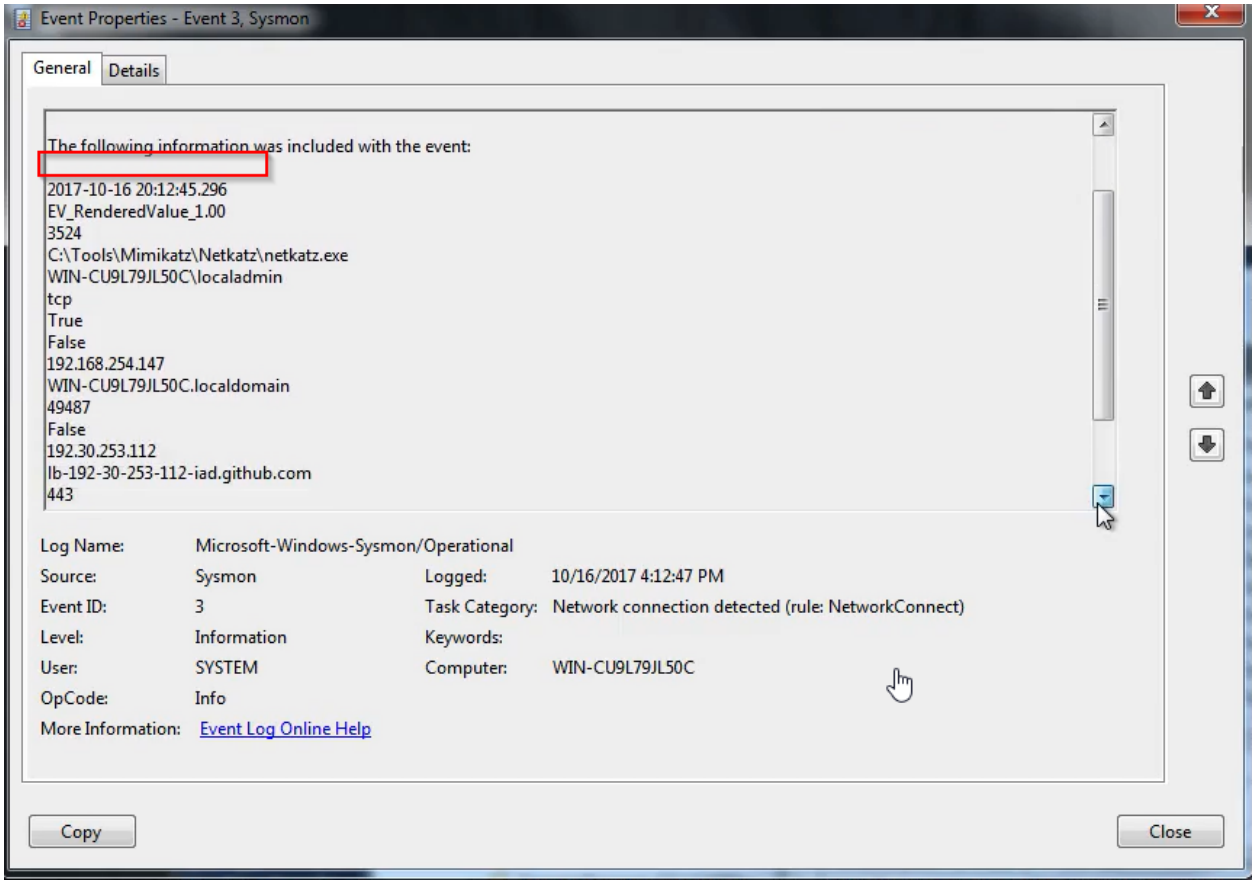
After looking we see this:



We see it went to the github.com, maybe to get the mimkazt from the github.com and other tools from other address and then loaded into the memory. So that's why we see the other address in the screen show about this that has IP 52.*.

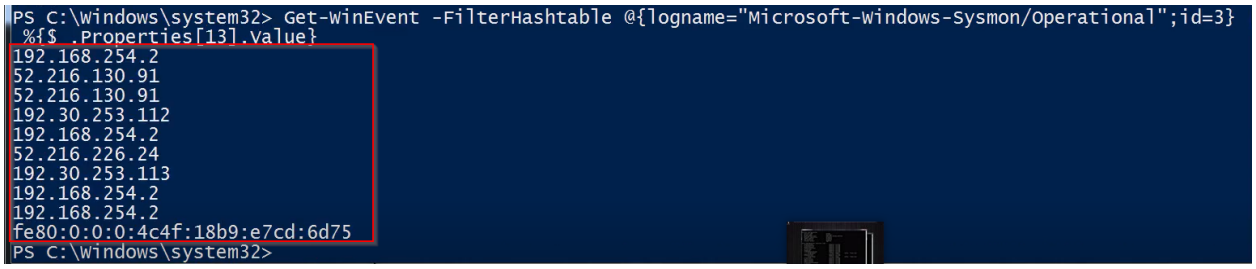
And if we count here, we will see the IP address of the server this host communicated is in line 13 which is index 12? No there is an empty line as well , so to look for this in the powershell, we will have to put 13 in the properties.

The empty line:



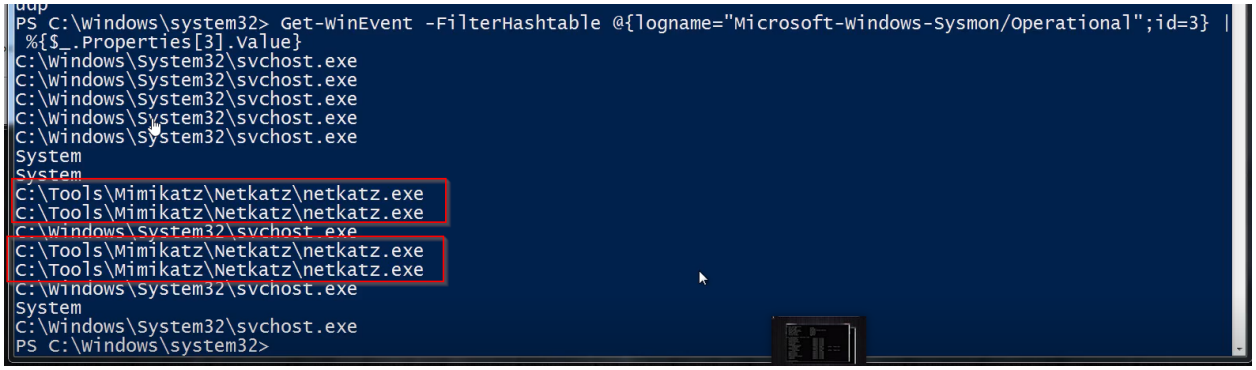
NOTE: we can always check, if we didn't get the value we wanted, we will try one up or down index:

Lets try 13:



Here we got all the IPS this host communicated with, if this was real scenario then we would blacklist those IPs.

To get the Process that made those connection we would put the index location 3,



We see that 4 of network connections are made by the netkatz.exe